

STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE
This permit includes designated equipment subject to
New Source Performance Standard – Subpart DD, III, Kb and VVa.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

Osage Bio Energy, LLC
Appomattox Bio Energy Facility
5219-A Hickory Park Drive, Suite 103
Glen Allen, VA 23059
Registration No.: 52211
County-Plant ID: 670-00078

is authorized to construct and operate:

a 68.2 Million Gallons Per Year (MGY) fuel-grade **un-denatured** ethanol
and distiller's grain production facility

located at:

54 acre Industrial Parcel bounded east by rail yard, south by Winston
Churchill Avenue, west by Sixth Avenue and north by La Prade Avenue
100 South Main Street Hopewell, Virginia

in accordance with the Conditions of this permit.

Approved on:

TBD, 2008

Kyle I. Winter, P.E.
Deputy Regional Director

Permit consists of **18** pages.
Permit Conditions 1 to **46**
Source Testing Report Format

INTRODUCTION

This permit approval is based on the permit application dated December 6, 2007 and revision sheet on January 25, 2008, February 28, 2008 and March 18, 2008. Any changes in the permit application specifications or any existing facilities that alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-10 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the facility to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

PROCESS REQUIREMENTS**1. Equipment List** - Equipment at this facility consists of the following:

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
	Plant		
1	Fuel-grade ethanol and distiller's grain production facility including haul roads.	68.2 MGY (un-denatured)	NSPS DD, IIII, Kb, VVa and 40 CFR 60.8.
	Backup		
EU-58	One 2750 kW backup (emergency and maintenance only) diesel generator (<= 500 hours per year).	2750kW/ 27.94 MMBtu/hr/ 3841 BHP	NSPS IIII and 40 CFR 60.8.
EU-59	One backup (emergency and maintenance only) diesel pump (< 500 hours per year).	2.11 MMBtu/hr Or 290 BHP	NSPS IIII and 40 CFR 60.8.
	Tanks		
TK-01	Shift Tank No. 1.	420,000 gallons	NSPS Kb.
TK-02	Shift Tank No. 2.	420,000 gallons	NSPS Kb.
TK-03	Shift Tank No. 3.	420,000 gallons	NSPS Kb.
TK-04	Shift Tank No. 4.	420,000 gallons	NSPS Kb.
TK-05	Denaturant Tank.	420,000 gallons	NSPS Kb.
TK-06	Denatured Ethanol Tank No. 1.	900,000 gallons	NSPS Kb.

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
TK-07	Denatured Ethanol Tank No. 2.	900,000 gallons	NSPS Kb.
	Grain Receiving		
EU-01	Truck Dump Pit No. 1.	840 tons per hour	NSPS DD.
EU-02	Truck Dump Pit No. 2.	840 tons per hour	NSPS DD.
EU-03	Rail Dump Pit.	840 tons per hour	NSPS DD.
EU-04	Grain Receiving Conveyors No. 1.	840 tons per hour	NSPS DD.
EU-05	Grain Cleaner.	840 tons per hour	NSPS DD.
EU-06	Grain Receiving Elevator(s).	840 tons per hour	NSPS DD.
EU-07	Grain Receiving Conveyors No. 2.	840 tons per hour	NSPS DD.
EU-08	Storage Silo No. 1.	15,000 Tons	NSPS DD.
EU-09	Storage Silo No. 2.	15,000 Tons	NSPS DD.
EU-10	Storage Silo No. 3.	15,000 Tons	NSPS DD.
EU-11	Storage Silo No. 4.	15,000 Tons	NSPS DD.
EU-12	Storage Silo No. 5.	15,000 Tons	NSPS DD.
EU-13	Storage Silo No. 6.	15,000 Tons	NSPS DD.
EU-14	Storage Silo No. 7.	15,000 Tons	NSPS DD.
EU-15	Storage Silo No. 8.	15,000 Tons	NSPS DD.
	Grain Processing		
EU-16	Hammermill Feed Conveyors.	180 tons per hour	NSPS DD.
EU-17	Bucket Elevator.	180 tons per hour	NSPS DD.
EU-18	Surge Bin.	180 tons per hour	NSPS DD.
EU-19	Hammermill No. 1.	90 tons per hour	NSPS DD.
EU-20	Hammermill No. 2.	90 tons per hour	NSPS DD.
EU-21	Hammermill No. 3.	90 tons per hour	NSPS DD.
EU-22	Hammermill No. 4.	90 tons per hour	NSPS DD.
	Fermentation		
EU-23	Mash Mingler.	350 tons per hour	NSPS VVa.
EU-24	Mash Mix Tank.	100,000 gallons	NSPS VVa.

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
EU-25	Liquifaction Tank.	200,000 gallons	NSPS VVa.
EU-26	Yeast Slurry Tank.	150,000 gallons	NSPS VVa.
EU-27	Fermenter No. 1.	750,000 gallons	NSPS VVa.
EU-28	Fermenter No. 2.	750,000 gallons	NSPS VVa.
EU-29	Fermenter No. 3.	750,000 gallons	NSPS VVa.
EU-30	Fermenter No. 4.	750,000 gallons	NSPS VVa.
EU-31	Fermenter No. 5.	750,000 gallons	NSPS VVa.
EU-32	Fermenter No. 6.	750,000 gallons	NSPS VVa.
EU-33	Beerwell.	1,000,000 gallons	NSPS VVa.
EU-34	Beer Stripper.	175 tons per hour	NSPS VVa.
EU-35	Beer Stripper.	175 tons per hour	NSPS VVa.
EU-36	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-37	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-38	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-39	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-40	Whole Stillage.	250 tons per hour	NSPS VVa.
EU-41	Thin Stillage.	250 tons per hour	NSPS VV.
EU-42	Syrup Tank.	175,000 gallons	NSPS VVa.
EU-43	Centrifuges.	350 tons per hour	NSPS VVa.
EU-44	Centrifuges.	350 tons per hour	NSPS VVa.
EU-45	Centrifuges.	350 tons per hour	NSPS VVa.
EU-46	Centrifuges.	350 tons per hour	NSPS VVa.
EU-47	Evaporator System.	200 tons per hour	NSPS VVa.
	VOC Control Equipment (DDGS)		
EU-48	Regenerative Thermal Oxidizer (RTO)	2.0 MMBtu/hr	40 CFR 60.8*
EU-49	Eco Dryer No 1.	57.8 MMBtu/hr	40 CFR 60.8*
EU-50	Eco Dryer No 2.	57.8 MMBtu/hr	40 CFR 60.8*
EU-51	Eco Dryer No 3.	57.8 MMBtu/hr	40 CFR 60.8*

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
	DDGS Drying Process		
EU-52	DDGS Conveyor.	34 tons per hour	-
EU-53	DDGS Evaporator.	106 tons per hour	-
EU-54	DDGS Loadout.	34 tons per hour	-
EU-55	DDGS Truck Loadout.	34 tons per hour	-
	Ethanol Loadout		
EU-56	Ethanol Loading Rack.	71.6 MGY	-
EU-57	Loadout Control Flare.	6.4 MMBtu/hr	40 CFR 60.8*
	Particulate Control Equipment		
EP-01	Grain Receiving Baghouse.	40,000 SCFM	40 CFR 60.8*
EP-02	Grain Handling Baghouse.	10,000 SCFM	40 CFR 60.8*
EP-03	Hammermill No. 1 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-04	Hammermill No. 2 Baghouse .	7,000 SCFM	40 CFR 60.8*
EP-05	Hammermill No. 3 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-06	Hammermill No. 4 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-07	DDGS Handling Baghouse .	3,000 SCFM	40 CFR 60.8*
EP-08	DDGS Loadout Baghouse.	3,000 SCFM	40 CFR 60.8*

*** Procedures to be used for testing non-NSPS equipment, if required.**

(9 VAC 5-80-1100)

2. **Emission Controls – Nitrogen Dioxide emissions from the Regenerative Thermal Oxidizer (RTO) and three Eco Dryers shall be minimized by the original equipment burner design when firing natural gas/ethanol mixture. Regenerative Thermal Oxidizer (RTO) and three Eco Dryers shall be provided with adequate access for inspection. The facility shall operate and maintain the Regenerative Thermal Oxidizer (RTO) and three Eco Dryers and associated air pollution control equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.**
(9 VAC 5-50-260 and 9 VAC 5-50-20E)

3. **Emission Controls – Sulfur Dioxide emissions from the Regenerative Thermal Oxidizer (RTO) and three Eco Dryers shall also be controlled by firing Natural Gas/ethanol mixture, a low sulfur fuel. The facility shall operate and maintain the Regenerative Thermal Oxidizer (RTO) and three Eco Dryers and associated air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.**
(9 VAC 5-50-260, 9 VAC 5-80-1180 A 1 and 9 VAC 5-50-20E)

4. **Emission Controls** – VOC emissions from the fermentation and distillation process units shall be controlled by a process wet scrubber and the Regenerative Thermal Oxidizer. The facility may control VOC emissions using a CO2 Recovery Plant in place of the Regenerative Thermal Oxidizer. VOC emission from the DDGS drying process shall be controlled by the Eco Dryer systems. These units shall be operated so that each unit is operated above the minimum required combustion temperature to ensure proper emission control. Pre-fermentation units, the stillage tanks, the syrup tank, centrifuge units and the evaporator system shall vent to the atmosphere as fugitive emissions.
(9 VAC 5-50-260 and 9 VAC 5-80-1180 A.1)
5. **Emission Controls** – Carbon Monoxide emissions from the Regenerative Thermal Oxidizer and three Eco Dryers shall be controlled by good combustion practices. Particulate Matter emissions from the Regenerative Thermal Oxidizer and three Eco Dryers shall be controlled by good combustion practices. These units shall be operated so that each unit is operated above the minimum required combustion temperature to ensure proper emission control. The particulate control bag houses shall be operated when receiving grain , operating any of the hammer mills and when operating DDGS handling and/or load out to minimize emissions.
(9 VAC 5-50-260, 9 VAC 5-80-1180 and 9 VAC 5-170-160)
6. **Emission Controls** – Any uncontrolled venting of ethanol vapors from the Regenerative Thermal Oxidizer and three Eco Dryers is prohibited. All atmospheric vents in the ethanol system shall be controlled by a lockout-tag-out system or by installing and operating a device to divert the emissions from all vents to an approved control system, except the pre-fermentation units, stillage tanks, the syrup tank, centrifuge units and the evaporator system shall vent to the atmosphere as fugitive emissions.
(9 VAC 5-50-260, 9 VAC 5-50-410, 9 VAC 5-80-1180 and 9 VAC 5-170-160)
7. **Emission Controls** – The Regenerative Thermal Oxidizer and three Eco Dryers shall control VOC by use of the original equipment burner design when firing natural gas/ethanol mixture. Regenerative Thermal Oxidizer and at least one of the three Eco Dryers (except when producing wet-cake for storage and sale) shall be in operation whenever the facility is operating. If any components of the Regenerative Thermal Oxidizer and/or all Eco Dryers malfunction, the ethanol production system shall be shut down in a reasonable time, if necessary to prevent excess emissions.
(9 VAC 5-50-260 and 9 VAC 5-50-410)
8. **Monitoring Devices** - The facility shall be equipped with devices to continuously measure and record (totalizer) the consumption of natural gas by the Regenerative Thermal Oxidizer (RTO) and three Eco Dryers. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the facility is operating.
(9 VAC 5-80-1180 and 9 VAC 5-50-20 C)
9. **Monitoring Devices** - Regenerative Thermal Oxidizer (RTO) and three Eco Dryers shall be equipped with a device to continuously measure hours of operation and the combustion temperatures. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the units are operating.
(9 VAC 5-80-1180 and 9 VAC 5-50-20 C)

10. **Monitoring Devices** - The facility shall be equipped with flow devices to continuously measure the ethanol production per hour (totalizer) by the ethanol production facility. At a minimum, devices shall be located just before and just after the denaturent process. Each monitoring device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the facility is operating.
(9 VAC 5-80-1180 and 9 VAC 5-50-20 C)
11. **Monitoring Device Observation** - The facility shall log observations of hours and natural gas flow to the **Regenerative Thermal Oxidizer and three Eco Dryers** when operating (noted as "OFF" when not running). The log shall contain a minimum of hourly observations processed monthly and stored onsite. The facility will maintain a written log, stored onsite, containing hourly observations for the periods of electronic/computer problems/failure to commence within one hour of an electronic records problem/computer failure. The log shall be used for emissions calculations during periods where some or all electronic data are not available. In the case where no electronic information or manual records are available, the facility will calculate emissions using worse case scenario.
(9 VAC 5-50-50 F)
12. **Monitoring Device Observation** - The monitoring devices used to measure hours of operation of the individual control systems shall be observed by the facility with a frequency of not less than hourly whenever the **ethanol plant components** are operating. The facility shall keep a daily log of the hours of operation observations from the monitoring devices including the time the observation was recorded.
(9 VAC 5-50-50 F)
13. **Monitoring Device Observation** - The monitoring device used to measure the flow of ethanol production shall be observed by the facility whenever the **Regenerative Thermal Oxidizer and at least one of the three Eco Dryers** are in operation with a frequency of not less than daily to ensure good performance of the control systems. The facility shall keep a daily log of the observations from the monitoring device.
(9 VAC 5-50-50 F and 9 VAC 5-50-410)
14. **Fugitive Dust Emission Controls** – Fugitive dust and Fugitive emission controls shall include the following, or equivalent, as approved by DEQ:
 - a. All cover material being stockpiled shall be kept adequately moist to control dust during storage and handling or covered at all times to minimize emissions as appropriate.
 - b. Dust from haul roads and traffic areas shall be controlled by the application of asphalt, water, or suitable chemicals or equivalent methods as approved by the DEQ as necessary.
 - c. Reasonable precautions shall be taken to prevent deposition of dirt on public roads and subsequent dust emissions. These measures shall include paving the haul roads. Trucks entering or leaving the site shall have clean wheels which may be achieved by use of a wheel washer or equivalent, if necessary. Dirt, product, or raw material spilled or tracked onto paved surfaces shall be promptly removed or wetted to prevent particulate matter from becoming airborne.
(9 VAC 5-50-90 and 9 VAC 5-80-1180)

15. **Sulfur Content** - The facility shall monitor quarterly the total sulfur content of the ethanol vapors and natural gas fuel being fired in the **Regenerative Thermal Oxidizer and three Eco Dryers**. The sulfur content of the natural gas fuel and ethanol vapor mixture shall be determined using the total sulfur method described in Gas Processors Association (GPA) Standard 2377 (see 40 CFR §60.17), which measures the major sulfur compound (Hydrogen Sulfide) using a "Length of Stain" Detector Tube or other approved method.
(9 VAC 5-50-20)
16. **Ethanol Plant Control Equipment** - The entire ethanol plant emissions control system as specified in Condition 20 shall be operational whenever ethanol is being produced or transferred. Verification of satisfactory operation of control equipment shall, at a minimum, include certification that manufacturer's written requirements or recommendations for installation, operation, and maintenance of the devices shall be followed.
(9 VAC 5-50-20 and 9 VAC 5-50-410)

OPERATING/EMISSION LIMITATIONS

17. **Fuel** - The approved fuels for the Regenerative Thermal Oxidizer and three Eco Dryers is Natural Gas and ethanol mixture. The approved fuel for the back up emergency generator and pump is low sulfur diesel fuel. A change in the fuels may require a permit to modify and operate.
(9 VAC 5-80-1180)
18. **Fuel Throughput** - The facility shall limit consumption of fuel to 1,525 million scf Natural Gas and 110,000 gallons of low sulfur No. 2 fuel oil such that total Nitrogen Dioxide and Sulfur Dioxide emissions do not exceeds the limits in Condition 24.
(9 VAC 5-80-1180)
19. **Fuel Specifications** - The fuels shall meet the specifications below:

Back up Generator and Pump

Fuel Oil; No. 2 (Low Sulfur)

Maximum Sulfur content per shipment: 0.05%
(500 ppmw)

Nominal Heat content: 137,000 BTU/gallon

Regenerative Thermal Oxidizer (RTO) and three Eco Dryers

Natural Gas/Ethanol Mixture:

Maximum Sulfur Limit: 238 ppmv Sulfur measure as H₂S

Nominal heat content: 1000 BTU/scf

(9 VAC 5-80-1180 and 40 CFR §60.4330)

20. **Ethanol Production Specifications** - The process scrubber and the Regenerative Thermal Oxidizer and/or the CO₂ recovery plant shall achieve a combined VOC destruction efficiency of at least 98% for those fermentation and distillation process units controlled. The minimum temperature for the Regenerative Thermal Oxidizer is 1400 degrees F. The particulate control bag houses shall achieve 99% control efficiency when receiving grain, operating any of the hammer mills and when operating DDGS handling and/or load out.
(9 VAC 5-80-1180)

21. **Fuel Certification** - The facility shall obtain a certification from the fuel supplier with each shipment of distillate. Each fuel supplier certification shall include the following:

- a. The name of the fuel supplier;
 - b. The date on which the distillate oil fuel oil was received;
 - c. The volume of distillate oil delivered in the shipment;
 - d. A statement that the distillate oil complies with the American Society for Testing and Materials specifications [D396-78] for numbers 1 or 2 fuel oil; and
 - e. The heat value (in Btu/gal) of the distillate oil; and
 - f. A statement that the sulfur content of the low sulfur distillate oil does not exceed 0.05% by weight and the method used to obtain the % sulfur result.
- (9 VAC 5-170-160)

22. **Requirements by Reference** - Except where this permit is more restrictive than the applicable requirement, the NSPS equipment as described in Condition 1 shall be operated in compliance with the requirements of 40 CFR 60, Subpart DD, Subpart IIII, Subpart Kb and NSPS Subpart VVa. (9 VAC 5-80-1180, 9 VAC 5-50-400 and 9 VAC 5-50-410)

23. **Emission Limits** - Emissions from the operation of Regenerative Thermal Oxidizer, three Eco Dryers combined, utility flare and the associated facility wide control equipment when the facility is producing ethanol and shall not exceed the limits specified below:

	Eco-Dryers	RTO	Flare	Grain Handling*	Each Units
Particulate Matter	6.27	0.150		0.01 gr per dscf*	lb/hr
PM-10	6.27	0.150			lb/hr
PM-2.5	6.27	0.150			lb/hr
Sulfur Dioxide	6.90	0.001			lb/hr
Nitrogen Dioxide	17.60	0.200	3.20		lb/hr
Carbon Monoxide	12.65	0.168	8.00		lb/hr
Volatile Organic Compounds	7.59	0.0110			lb/hr

	Eco-Dryers	RTO	Flare	Each Units
Particulate Matter	0.04	0.01		lb/mmBtu
PM-10	0.04	0.01		lb/mmBtu
PM-2.5	0.04	0.01		lb/mmBtu
Sulfur Dioxide	0.04			lb/mmBtu
Nitrogen Dioxide	0.10	0.10	0.50	lb/mmBtu
Carbon Monoxide	0.07	0.08	1.25	lb/mmBtu
Volatile Organic Compounds	0.04	0.01		lb/mmBtu

Compliance with the PM-10 emissions limits shall be deemed compliance with the PM – 2.5 emissions limits. Compliance with the lb/hr and lb/MMBtu limits for PM, PM-10, NO_x, CO and VOC shall be determined by stack testing. *The NSPS Subpart DD standard is applicable to grain processing. The NSPS Subpart VVa Standards are also included for VOC. All other emission limits are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits shall be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Condition numbers 2 through 7, 15, 18, 19, 20 and 21.
(9 VAC 5-50-260 and 9 VAC 5-50-180)

24. **Plant-wide Emission Limits** - Total emissions from the facility shall not exceed the limits specified below, calculated monthly as the sum of each consecutive 12-month period:

	Total
Particulate Matter	88.3 tons/year
PM-10	60.4 tons/year
PM-2.5	60.4 tons/year
Sulfur Dioxide	30.5 tons/year
Nitrogen Dioxide	95.2 tons/year
Carbon Monoxide	65.4 tons/year
Volatile Organic Compounds	75.6 tons/year
Individual HAPs	<9.9 tons/year
HAP (for aggregate HAPs)	<24.9 tons/year

Emissions limits are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits shall be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Condition numbers 2 through 7, 15, 18, 19, 20 and 21.
(9 VAC 5-50-260 and 9 VAC 5-50-180)

25. **Visible Emission Limit** - Visible emissions from the **Regenerative Thermal Oxidizer and three Eco Dryers** stacks shall not exceed 10% opacity whenever the affected emission control devices are operated except during one six-minute period in any one hour in which visible emissions shall not exceed 20% opacity. All visible emissions rates shall be determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown, and malfunction.
(9 VAC 5-50-80 and 9 VAC 5-50-260)

RECORDS

26. **On Site Records** - The facility shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Director, Piedmont Region. These records shall include, but are not limited to:
- a. Annual throughput of low sulfur No.2 fuel oil and natural gas calculated monthly as the sum of each consecutive 12-month period to verify compliance with Condition **18**;
 - b. Daily records of production and Natural Gas combustion data to verify compliance with Conditions **8, 10, 13** and **18**;
 - c. Daily log of the combustion temperatures of the Regenerative Thermal Oxidizer and each operating Eco Dryers to verify compliance with Condition **20** and Condition **31**.
 - d. Hourly records of operation of the Regenerative Thermal Oxidizer and three Eco Dryers readings to verify compliance with Conditions **9** and **11**;
 - e. Monthly and annual emission (in tons) using calculation methods approved by the Piedmont Regional Office to verify compliance with emission limitations in Condition **24**. Annual emissions shall be calculated monthly (by the 15th of the following month) as the sum of each consecutive 12-month period;
 - f. Results of all stack tests, visible emission evaluations, monthly visible emission evaluations log and performance evaluations;
 - g. All fuel supplier certifications and quarterly Natural Gas/ethanol vapor mixture sulfur content test, Condition **15**;
 - h. Scheduled and unscheduled maintenance on the ethanol plant;
 - i. Operating procedures and operator training records for the Regenerative Thermal Oxidizer and three Eco Dryers as required in Condition 46;
 - j. All records generated by the device installed for the purpose of continuously monitoring and recording the status of the Regenerative Thermal Oxidizer and three Eco Dryers as required by Condition **11**.
 - k. All records required by NSPS Subpart DD, Subpart IIII, Subpart Kb and Subpart VVa as required by Condition 22.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

(9 VAC 5-50-50 and 9VAC 5-50-410)

INITIAL COMPLIANCE DETERMINATION

27. **Stack Test -** Initial performance tests shall be conducted for VOC, NO_x and SO₂ from the **Regenerative Thermal Oxidizer and Eco Dryers** to determine compliance with the emission limits contained in Conditions 23 and 24. The tests shall be performed while operating using Natural Gas. The tests shall be performed at no less than 80% of the rated capacity of the ethanol output on a minimum of one of the **three Eco Dryers** and the **Regenerative Thermal Oxidizer** at a time. **Regenerative Thermal Oxidizer and each Eco Dryers** shall be tested as described below if or when installed. The tests shall be performed, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. The tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30 and the test methods and procedures contained in each applicable section or subpart listed in 9 VAC 5-50-410. The details of the tests are to be arranged with the Director, Piedmont Region. The facility shall submit a test protocol at least 30 days prior to testing. Two copies of the test results shall be submitted to the Director, Piedmont Region within 60 days after test completion and shall conform to the test report format enclosed with this permit. (9 VAC 5-50-20, 9 VAC 5-50-30 and 9 VAC 5-80-1200)
28. **Stack Test -** Initial performance tests shall be conducted for VOC, NO_x and SO₂ pollutant emissions from the **complete VOC emissions control system comprised of the Regenerative Thermal Oxidizer and all three Eco Dryers** to determine compliance with the emission limits contained in Conditions 23 and 24. The tests shall be performed at no less than 80% of the rated capacity for the upper point of the ethanol output on all **three Eco Dryers and the Regenerative Thermal Oxidizer (RTO)** at two points. The lower of the two points shall define the range in ethanol production that the ethanol facility meets the emissions limits for VOC, NO_x and SO₂. **SO₂ results are not required for the lower point test.** The tests shall be performed, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated, but in no event later than 180 days after start-up of the permitted facility. The tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30 and the test methods and procedures contained in each applicable section or subpart listed in 9 VAC 5-50-410. The details of the tests are to be arranged with the Director, Piedmont Region. The facility shall submit a test protocol at least 30 days prior to testing. Two copies of the test results shall be submitted to the Director, Piedmont Region within 60 days after test completion and shall conform to the test report format enclosed with this permit. (9 VAC 5-50-20, 9 VAC 5-50-30 and 9 VAC 5-80-1200)

29. **Initial Performance Test -** Concurrently with the initial and subsequent performance test as required in Conditions 27 and 28, the facility shall determine the total sulfur content (as H₂S in ppmv using detector tubes, for the upper limit test only) of the natural gas/ethanol mixture, as sampled, prior to combustion in the **Regenerative Thermal Oxidizer and all three Eco Dryers**. Each test shall be reported and data reduced as set forth in 9 VAC 5-50-30 and the test methods and procedures contained in each applicable section or subpart listed in 9 VAC 5-50-410. The details of the test are to be arranged with the Piedmont Regional Office. The facility shall submit a test protocol at least 30 days prior to testing. Two copies of the test results shall be submitted to the Piedmont Regional Office within 60 days after test completion and shall conform to the test report format enclosed with this permit.
(9 VAC 5-50-20 and 9 VAC 5-50-30, 9 VAC 5-50-410 and 9 VAC 5-80-1200)
30. **Visible Emissions Evaluation -** Concurrently with the initial and subsequent performance tests required in Conditions 27 and 28, Visible Emission Evaluations (VEE) in accordance with 40 CFR Part 60, Appendix A, Method 9, shall also be conducted by the facility on the discharge of the RTO and Eco Dryers tested. Each test shall consist of 30 sets of 24 consecutive observations (at 15 second intervals) to yield a six minute average. The details of the tests are to be arranged with the Director, Piedmont Region. The facility shall submit a test protocol at least 30 days prior to testing. The evaluation shall be performed, and reported and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted facility. Should conditions prevent concurrent opacity observations, the Director, Piedmont Region shall be notified in writing, within seven days, and visible emissions testing shall be rescheduled within 30 days. Rescheduled testing shall be conducted under the same conditions (as possible) as the initial performance tests. Two copies of the test result shall be submitted to the Director, Piedmont Region within 60 days after test completion and shall conform to the test report format enclosed with this permit.
(9 VAC 5-50-20, 9 VAC 5-50-30, 9 VAC 5-50-410 and 9 VAC 5-80-1200)

CONTINUING COMPLIANCE DETERMINATION

31. **VOC Control –** Compliance with the VOC removal efficiency referenced in Condition 20 shall be determined by the hourly average combustion temperature of the specified control device and visually checked at least once each operating day. The facility shall maintain a daily log of these observations, which shall include the date and time of each observation.
(9 VAC 5-50-20 E, 9 VAC 5-50-30 G, 9 VAC 5-80-1180 and 9 VAC 5-170-160)
32. **Performance Validation Testing -** The facility shall perform a performance test to demonstrate continuous compliance for the VOC, NO_x and SO₂ emission limit. The VOC, NO_x and SO₂ performance tests required in Conditions 27 and/or 28 shall at a minimum be conducted once every 5 years on all stacks, starting from the completion date of the testing as required in Condition 27 and/or 28. The test shall be performed at no less than 80% of the rated capacity of the maximum ethanol output. The tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30 and the test methods and procedures contained in each applicable section or subpart listed in 9 VAC 5-50-410. The details of the tests are to be arranged with the Director, Piedmont Region. The facility shall submit a test protocol at least 30 days prior to testing. Two copies of the test results shall be submitted to the Director, Piedmont Region within 60 days after test completion and shall conform to the test report format enclosed with this permit.
(9 VAC 5-50-20, 9 VAC 5-50-30, 9 VAC 5-50-410 and 9 VAC 5-80-1200)

33. **Test/Monitoring Ports** - The permitted facility shall be constructed so as to allow for emissions testing and monitoring upon reasonable notice at any time, using appropriate methods. This includes constructing the facility such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and providing stack or duct that is free from cyclonic flow. Test ports shall be provided when requested at the appropriate locations.
(9 VAC 5-50-30 F)
34. **Visible Emissions Evaluations:** Continuing Compliance – Once per month, the facility shall conduct an observation of the presence of visible emissions from the operating dust control equipment (bag houses), the **Regenerative Thermal Oxidizer and all three Eco Dryers**. If visible emissions are observed, the facility shall take timely corrective action such that the units resume operation with no visible emissions, or perform a visible emissions evaluation (VEE) in accordance with 40 CFR 60, Appendix A, Method 9 to assure visible emissions from any of ethanol plant components does not exceed 10% opacity whenever the ethanol plant components are operated, except during one six-minute period in any one hour in which visible emissions shall not exceed 20%. The VEE shall be conducted for a minimum of six minutes. If any of the observation exceeds 10% opacity, the VEE shall then be conducted for an additional sixty minutes. If compliance is not demonstrated by the VEE during the sixty minute observation, timely corrective action shall be taken such that the operating ethanol plant components resumes operation that is in compliance with the opacity limit. The facility shall maintain an observation log to demonstrate compliance. The log shall include the date and time of the observation, whether or not there were visible emissions, any VEE recordings and necessary corrective actions. Upon request by the DEQ, the facility shall conduct additional visible emission evaluations to demonstrate compliance with the visible emission limits contained in this permit. The details of the tests shall be arranged with the Director, Piedmont Region.
(9 VAC 5-170-160, 9 VAC 5-50-30 G, 9 VAC 5-50-50 and 9 VAC 5-50-410)

NOTIFICATIONS

35. **Initial Notifications** - The facility shall furnish written notification to the Director, Piedmont Region and US EPA at the address below:
- The actual date the first grain receiving occurs as required by NSPS Subpart DD.
 - The actual date on which the construction of the affected facilities subject to federal NSPS as referenced in Condition 1 are constructed within 30 days after such date.
 - The anticipated start-up date of the affected facilities subject to federal NSPS as referenced in Condition 1, postmarked not more than 60 days nor less than 30 days prior to such date.
 - The actual start-up date of the affected facilities subject to federal NSPS as referenced in Condition 1 within 15 days after such date.
 - The anticipated date of performance tests of the affected facilities subject to federal NSPS requiring initial performance testing and as referenced in Condition 1 postmarked at least 30 days prior to each such date.

Copies of the written notification referenced in terms a. through d. are to be sent to:

Associate Director
Office of Air Enforcement (3AP10)
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

(9 VAC 5-50-50, 9 VAC 5-80-1180 and 9 VAC 5-50-410)

GENERAL CONDITIONS

36. **Record of Malfunction** - The facility shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9 VAC 5-20-180 J and 9 VAC 5-80-1180 D)
37. **Notification for Facility or Control Equipment Malfunction** - The facility shall furnish notification to the Director, Piedmont Region of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone, certified electronic mail or telegraph. Such notification shall be made as soon as practicable but not later than four daytime business hours of the malfunction. The facility shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within 14 days of the occurrence. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the facility shall notify Director, Piedmont Region in writing.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)
38. **Permit Invalidation** - This permit to construct the ethanol production facility shall become invalid, unless an extension is granted by the DEQ, if:
- a. A program of continuous construction is not commenced before the latest of the following:
 - (1) 18 months from the date of this permit;
 - (2) Nine months from the date that the last permit or other authorization was issued from any other governmental entity;
 - (3) Nine months from the date of the last resolution of any litigation concerning any such permits or authorization; or
 - b. A program of construction is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of a phased construction project.
- (9 VAC 5-80-1210)

39. **Right of Entry** - The facility shall allow authorized local, state and federal representatives, upon the presentation of credentials:
- To enter upon the premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
 - To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
 - To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
 - To sample or test at reasonable times.
- For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.
(9 VAC 5-170-130 and 9 VAC 5-80-1180)
40. **Violation of Ambient Air Quality Standard** - The facility shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)
41. **Maintenance/Operating Procedures** - The facility shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment, monitoring devices, and process equipment which affect such emissions:
- Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
 - Maintain an inventory of spare parts.
 - Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.
 - Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures. The facility shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training. Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.
(9 VAC 5-50-20 E)
42. **Permit Suspension/Revocation** - This permit may be suspended or revoked if the facility:
- Knowingly makes material misstatements in the application for this permit or any amendments to it;
 - Fails to comply with the conditions of this permit;

- c. Fails to comply with any emission standards applicable to the permitted emissions unit;
- d. Causes emissions from this facility which result in violations of, or interferes with the attainment and maintenance of, any ambient air quality standard; or
- e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emission limitations, in the State Implementation Plan in effect on the date that the application for this permit is submitted.

(9 VAC 5-80-1210 F)

43. **Change of Ownership -** In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the Director, Piedmont Region of the change in ownership within 30 days of the transfer.

(9 VAC 5-80-1240)

44. **Permit Copy -** The facility shall keep a copy of this permit on the premises of the facility to which it applies.

(9 VAC 5-80-1180)

STATE-ONLY ENFORCEABLE (SOE) REQUIREMENTS

The following terms and conditions are included in this permit to implement the requirements of 9 VAC 5-40-130 et seq., 9 VAC 5-50-130 et seq., 9 VAC 5-60-200 et seq. and/or 9 VAC 5-60-300 et seq. and are enforceable only by the Virginia Air Pollution Control Board. Neither their inclusion in this permit nor any resulting public comment period make these terms federally enforceable.

45. **Throughput (SOE)**- The throughput of Dry Distiller's Grain Solids shall not exceed 297,000 tons per year (Dry Basis), calculated monthly as the sum of each consecutive 12 month period. (9 VAC 5-80-1120 F and 9 VAC 5-60-320)

46. **Toxic Emission Limits (SOE) - Toxic** pollutant emissions from the operation of the ethanol plant shall not exceed the limits specified below:

Acetaldehyde (CAS # 75-07-0)	6.6 lbs/hr	9.4 tons/yr
Acrolein (CAS # 107-02-8)	0.06 lbs/hr	0.7 tons/yr

[These emissions are derived from the estimated emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Condition number(s) 46.]

(9 VAC 5-80-1120 F and 9 VAC 5-60-320)

SOURCE TESTING REPORT FORMAT

Cover

1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Tester; name, address and report date

Certification

1. Signed by team leader / certified observer (include certification date)
- * 2. Signed by reviewer

Introduction

1. Test purpose
2. Test location, type of process
3. Test dates
- * 4. Pollutants tested
5. Test methods used
6. Observers' names (industry and agency)
7. Any other important background information

Summary of Results

1. Pollutant emission results / visible emissions summary
2. Input during test vs. rated capacity
3. Allowable emissions
- * 4. Description of collected samples, to include audits when applicable
5. Discussion of errors, both real and apparent

Source Operation

1. Description of process and control devices
2. Process and control equipment flow diagram
3. Process and control equipment data

*** Sampling and Analysis Procedures**

1. Sampling port location and dimensioned cross section
2. Sampling point description
3. Sampling train description
4. Brief description of sampling procedures with discussion of deviations from standard methods
5. Brief description of analytical procedures with discussion of deviation from standard methods

Appendix

- * 1. Process data and emission results example calculations
2. Raw field data
- * 3. Laboratory reports
4. Raw production data
- * 5. Calibration procedures and results
6. Project participants and titles
7. Related correspondence
8. Standard procedures

* Not applicable to visible emission evaluation

ENGINEERING ANALYSIS

Source Name: Appomattox Bio Energy, LLC Facility

Registration No.: 52211

Source Location: City of Hopewell

County Plant ID No.: 670-00078

Date: March 18, 2008

Permit Writer Initials: HLL

1. Introduction and Background

a. Company Background

Osage Bio Energy, LLC plans to operate a 68.2 million gallons per year un-denatured ethanol and distiller's grain production plant on the 54 acre industrial site in the City of Hopewell, Virginia with a new street address of 100 South Main Street. The facility is located on a site that is suitable from an air pollution standpoint which was determined by an Air Compliance visit on March 13, 2008. The Local Governing Body Form was returned after more than 45 days, but was signed on February 27, 2008 and the fully consistent block was not checked because further zoning changes are required. However, the local jurisdiction has expressed its complete support for the proposed facility and is confident that the proposed facility will be fully consistent with all applicable local ordinances once Osage completes the purchase of the proposed facility property.

This minor permit (<100 TPY) is for the ethanol plant components that are NSPS Subpart DD, IIII, Kb and VVa applicable.

b. Proposed Project Summary

DEQ received a permit application on December 6, 2007 to construct a new 68.2 million gallons per year un-denatured ethanol and distiller's grain production facility. The plant will use natural gas and low sulfur No.2 fuel oil for emissions control and backup power. The proposed minor source (<100 TPY) will have to comply with NSPS Subpart DD, Kb, IIII and VVa. The minor source permit request is an indication of the facilities desire to have as simple a permit as possible. The application as compared to other facilities in the west and the permits reviewed supports the emission factors used to estimate emissions by the applicant.

c. Process and Equipment Description

The Osage Bio Energy process is somewhat complicated with about sixty individual equipment steps (See table on next page). The application contains a detailed process discussion and flow diagram (see attached). The BACT analysis selected the best control presented in the application for each pollutant. Attached is a summary of the estimated cost per ton.

PROCESS REQUIREMENTS

Equipment List - Equipment at this facility consists of the following:

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
	Plant		
1	Fuel-grade ethanol and distiller's grain production facility including haul roads.	68.2 MGY (un-denatured)	NSPS DD, IIII, Kb, VVa and 40 CFR 60.8.
	Backup		
EU-58	One 2750 kW backup (emergency and maintenance only) diesel generator (<= 500 hours per year).	2750kW/ 27.94 MMBtu/hr/ 3841 BHP	NSPS IIII and 40 CFR 60.8.
EU-59	One backup (emergency and maintenance only) diesel pump (< 500 hours per year).	2.11 MMBtu/hr Or 290 BHP	NSPS IIII and 40 CFR 60.8.
	Tanks		
TK-01	Shift Tank No. 1.	420,000 gallons	NSPS Kb.
TK-02	Shift Tank No. 2.	420,000 gallons	NSPS Kb.
TK-03	Shift Tank No. 3.	420,000 gallons	NSPS Kb.
TK-04	Shift Tank No. 4.	420,000 gallons	NSPS Kb.
TK-05	Denaturant Tank.	420,000 gallons	NSPS Kb.
TK-06	Denatured Ethanol Tank No. 1.	900,000 gallons	NSPS Kb.
TK-07	Denatured Ethanol Tank No. 2.	900,000 gallons	NSPS Kb.
	Grain Receiving		
EU-01	Truck Dump Pit No. 1.	840 tons per hour	NSPS DD.
EU-02	Truck Dump Pit No. 2.	840 tons per hour	NSPS DD.
EU-03	Rail Dump Pit.	840 tons per hour	NSPS DD.
EU-04	Grain Receiving Conveyors No. 1.	840 tons per hour	NSPS DD.
EU-05	Grain Cleaner.	840 tons per hour	NSPS DD.
EU-06	Grain Receiving Elevator(s).	840 tons per hour	NSPS DD.
EU-07	Grain Receiving Conveyors No. 2.	840 tons per hour	NSPS DD.
EU-08	Storage Silo No. 1.	15,000 Tons	NSPS DD.
EU-09	Storage Silo No. 2.	15,000 Tons	NSPS DD.
EU-10	Storage Silo No. 3.	15,000 Tons	NSPS DD.
EU-11	Storage Silo No. 4.	15,000 Tons	NSPS DD.
EU-12	Storage Silo No. 5.	15,000 Tons	NSPS DD.
EU-13	Storage Silo No. 6.	15,000 Tons	NSPS DD.
EU-14	Storage Silo No. 7.	15,000 Tons	NSPS DD.
EU-15	Storage Silo No. 8.	15,000 Tons	NSPS DD.
	Grain Processing		
EU-16	Hammermill Feed Conveyors.	180 tons per hour	

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
			NSPS DD.
EU-17	Bucket Elevator.	180 tons per hour	NSPS DD.
EU-18	Surge Bin.	180 tons per hour	NSPS DD.
EU-19	Hammermill No. 1.	90 tons per hour	NSPS DD.
EU-20	Hammermill No. 2.	90 tons per hour	NSPS DD.
EU-21	Hammermill No. 3.	90 tons per hour	NSPS DD.
EU-22	Hammermill No. 4.	90 tons per hour	NSPS DD.
	Fermentation		
EU-23	Mash Mingle.	350 tons per hour	NSPS VVa.
EU-24	Mash Mix Tank.	100,000 gallons	NSPS VVa.
EU-25	Liquifaction Tank.	200,000 gallons	NSPS VVa.
EU-26	Yeast Slurry Tank.	150,000 gallons	NSPS VVa.
EU-27	Fermenter No. 1.	750,000 gallons	NSPS VVa.
EU-28	Fermenter No. 2.	750,000 gallons	NSPS VVa.
EU-29	Fermenter No. 3.	750,000 gallons	NSPS VVa.
EU-30	Fermenter No. 4.	750,000 gallons	NSPS VVa.
EU-31	Fermenter No. 5.	750,000 gallons	NSPS VVa.
EU-32	Fermenter No. 6.	750,000 gallons	NSPS VVa.
EU-33	Beerwell.	1,000,000 gallons	NSPS VVa.
EU-34	Beer Stripper.	175 tons per hour	NSPS VVa.
EU-35	Beer Stripper.	175 tons per hour	NSPS VVa.
EU-36	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-37	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-38	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-39	Molecular Seive.	24 tons per hour	NSPS VVa.
EU-40	Whole Stillage.	250 tons per hour	NSPS VVa.
EU-41	Thin Stillage.	250 tons per hour	NSPS VV.
EU-42	Syrup Tank.	175,000 gallons	NSPS VVa.
EU-43	Centrifuges.	350 tons per hour	NSPS VVa.
EU-44	Centrifuges.	350 tons per hour	NSPS VVa.
EU-45	Centrifuges.	350 tons per hour	NSPS VVa.
EU-46	Centrifuges.	350 tons per hour	NSPS VVa.
EU-47	Evaporator System.	200 tons per hour	NSPS VVa.
	VOC Control Equipment (DDGS)		
EU-48	Regenerative Thermal Oxidizer (RTO)	2.0 MMbtu/hr	40 CFR 60.8*

Reference No.	Equipment Description	Rated Capacity	Federal Requirements
EU-49	Eco Dryer No 1.	57.8 MMBtu/hr	40 CFR 60.8*
EU-50	Eco Dryer No 2.	57.8 MMBtu/hr	40 CFR 60.8*
EU-51	Eco Dryer No 3.	57.8 MMBtu/hr	40 CFR 60.8*
	DDGS Drying Process		
EU-52	DDGS Conveyor.	34 tons per hour	-
EU-53	DDGS Evaporator.	106 tons per hour	-
EU-54	DDGS Loadout.	34 tons per hour	-
EU-55	DDGS Truck Loadout.	34 tons per hour	-
	Ethanol Loadout		
EU-56	Ethanol Loading Rack.	71.6 MGY	-
EU-57	Loadout Control Flare.	6.4 MMBtu/hr	40 CFR 60.8*
	Particulate Control Equipment		
EP-01	Grain Receiving Baghouse.	40,000 SCFM	40 CFR 60.8*
EP-02	Grain Handling Baghouse.	10,000 SCFM	40 CFR 60.8*
EP-03	Hammermill No. 1 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-04	Hammermill No. 2 Baghouse .	7,000 SCFM	40 CFR 60.8*
EP-05	Hammermill No. 3 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-06	Hammermill No. 4 Baghouse.	7,000 SCFM	40 CFR 60.8*
EP-07	DDGS Handling Baghouse .	3,000 SCFM	40 CFR 60.8*
EP-08	DDGS Loadout Baghouse.	3,000 SCFM	40 CFR 60.8*

* Procedures to be used for testing non-NSPS equipment, if required.

d. Project Schedule

Date permit application received in region:	December 6, 2007
Date application was deemed complete:	March 14, 2008
Proposed construction commencement date:	TBD, 2008
Proposed start-up date:	TBD, 2008

2. Emissions Calculations (see attached application sheets)

The source has provided updated emissions calculations sheets revised to include 500 hours of emergency use of the back up generator and fire pump. The calculations were revised to reflect emissions without the use of the small RTO. Since only one RTO was proposed, the lower limits would have required the plant to shut down for maintenance or repair. The permit will require the facility to use the RTO or CO2 Recovery Plant, if available. On March 14, 2008, received replacement pages for the air permit application to include revised emissions calculation.

3. Regulatory Review

The proposed project is a new facility that will require a minor permit containing NSPS Subpart DD, NSPS Subpart IIII, NSPS Subpart Kb and NSPS Subpart VVa requirements. The facility has selected the most effective control equipment for PM, PM10 and PM2.5 to meet the NSPS Subpart DD requirements. The facility has chosen the appropriate low sulfur diesel fuel required by NSPS Subpart IIII and the facility will have to ensure the other requirements are met. The tanks are listed as NSPS Subpart Kb applicable where size and possible storage dictate including mechanical control such as floating roof systems. Portions of the facility are applicable to NSPS Subpart VVa, leak detection, repair and reporting for newer system.

The operating facility will have a substantial level of truck traffic and they have chosen to pave the haul roads and limit truck speed to 15 mph to reduce particulate emissions. If the fugitive dust emissions become problematic, the permit has the option to require wheel washers for inbound and outbound truck traffic.

The proposed project is **not** a major new source or a major modification nor does the proposed project trigger PSD or non-attainment requirements. The proposed project is subject to NSPS Subpart DD, NSPS Subpart IIII, NSPS Subpart Kb and NSPS Subpart VVa requirements. The draft permit conforms to the new approved minor source boilerplate.

a. Criteria Pollutants

No criteria pollutant modeling was conducted since the facility is not a suspected NAAQS violator and the source is a minor facility. The application does contain information that would allow modeling if needed.

b. Toxic Pollutants

Two toxic pollutants are not below the exemption level and are listed in the permit with limits (Acetaldehyde and Acrolein) and were added as State Only Enforceable (SOE) in Conditions 45 and 46 at the end of the permit. The facility is not major for a single HAP or for all HAPs (10/25 TPY level), which is in the facility wide limits for the permit.

c. Control Technology

The facility selected an array of controls that resulted in a synthetic minor level of emissions. The selected emissions control are primarily floating roof tanks, RTO, Eco dryer and leak detection for VOC controls; fabric filters, bag houses and paved roads for particulate control. The SO2 permit limit is confirmed by natural gas/ethanol vapor mixture indicator tube testing for H2S (<238.0 ppmv H2S) per Gas Processors Association (GPA) standard 2377 (see attached spreadsheet).

The selected controls from the application are the most stringent. The applicant provided an estimated cost per ton calculation for all the selected controls (see attached).

Control Units	Pollutant	Monitoring
Hammer mill Bag Houses	PM, PM 10, PM 2.5	Hourly electronic monitoring, Monthly VEO
Scrubber	VOC	Hourly electronic monitoring, Daily Visual Check
RTO/CO2 Recovery	VOC	Hourly electronic monitoring, Daily Visual Check, Monthly VEO
Eco Dryer	VOC	Hourly electronic monitoring, Daily Visual Check, Monthly VEO

Load out Flare	VOC	Hourly electronic monitoring, Monthly VEO
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4. Initial Compliance Determination (including references)

- a. VEEs – Monthly VEO for no opacity will be conducted. VEE is required for all stack tests.

5. Continuing Compliance Determination

- a. CEMS – None required. The facility is required to monitor natural gas fuel flow (totalizer) to the RTO and Eco Dryers, RTO and Eco Dryer hours of operation along with combustion temperatures and estimate total production of ethanol per hour. The facility is required to use a combination of electronic monitoring hourly and visual observations daily to confirm continuing compliance of the monitored parameters. These parameters are used to confirm the plant emissions on an hour by hour basis. Also, Condition 30 requires Monthly VEO for all particulate control and VOC control equipment.
- b. Recordkeeping – See condition 26.
- c. Further Testing – Initial performance test for VOC, NO_x and SO₂, then annual VOC, NO_x and SO₂ testing at least once every five years. DEQ will require the facility to determine the lowest production level that the proposed control equipment will comply with the permit limits. Monthly opacity observations (condition 30) to support ongoing compliance and enhanced monitoring for Title V (If the plant becomes a major source in the future).

6. Public Participation

Public briefing/ public hearing with comment period is required because this application has the potential for public interest concerning air quality issues.

7. Other Considerations

File Consistency Review – The NSR Boilerplate permit is the basis for this permit along with some similar size plant permit conditions from other states. The General Conditions were compared to the boilerplate.

- a. PRO Policy Consistency Review – NA (was compare to several out of state ethanol plant air permits)
- b. Confidentiality – NA
- c. Permit History – This permit is brand new.

8. Recommendations

Based on the information submitted, it is recommended that this permit be issued. Recommendations and limitations are provided in the draft permit letter.

Regional Engineer: _____

Date: _____

Reviewing Engineer: _____ Date: _____

Osage/NRG Comments March 14, 2008

Engineering analysis

- 1.a. – OK.
- 1.c. – OK, added comment that 40 CFR 60.8 would be used for non-NSPS equipment testing procedures.
- 2. – OK, reworded.
- 5.c. – OK.
- 6. – OK.

QA/QC required the addition of a new table on controls and revised wording.

Draft Permit

Revised Osage address.

Conditions

- 1. Added new date to introduction. Included general equipment sections in table and made smaller. End of table added * Procedures to be used for testing non-NSPS equipment, if required. i.e. Method 5.
- 2. OK.
- 3. OK.
- 4. OK.
- 5. OK, fixed DDGS. This is an overview; requirements go later in the permit.
- 6. OK.
- 7. OK, reworded.
- 8. OK.
- 9. OK, removed 9VAC 5-50-260.
- 10. OK, removed 9VAC 5-50-260.
- 11. OK.
- 12. OK.
- 13. OK, fixed.
- 14. OK, fixed.
- 15. OK.
- 16. OK.
- 17. OK.
- 18. OK, fixed.
- 19. OK, reworded
- 20. OK, fixed and reworded. Added baghouse.
- 21. OK.
- 22. OK.
- 23. OK, fixed grain handling standard. The lb/mmBtu limits are to ensure the VOC controls are effective at part production to full production (to be determined in the performance test).
- 24. OK, fixed HAPs. Removed individual HAPs and moved them to the state enforceable only (SEO) section at the end of the permit.
- 25. OK, fixed.
- 26. OK, removed old f and revised wording. These records provide information that indicates compliance on an hour by hour basis. Also, reflects our normal required records.
- 27. Test what you have installed once the plant starts up.
- 28. Test the entire system once all three Eco Dryers are installed and demonstrate two points (Low and above 80% production, hence the lb/mmBtu limits).
- 29. OK.
- 30. Reworded.

- 31. OK, but hourly and visually once per day when operating.
- 32. OK.
- 33. OK.
- 34. Added bag houses (Method 22, monthly observation).
- 35. OK, fixed wording.
- 36. OK.
- 37. OK.
- 38. OK.
- 39. OK.
- 40. OK.
- 41. OK.
- 42. OK.
- 43. OK.
- 44. OK.

State Enforceable Only conditions.

- 45. DDGS limit for HAPs.
- 46. Individual (2) HAP limits.